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## **A variational approach to epitaxially strained elastic films**

### **Abstract**

We consider a variational model introduced in the physical literature to describe the epitaxial growth of an elastic film over a flat substrate when a lattice mismatch between the two materials is present. We first study quantitative and qualitative properties of equilibrium configurations, that is, of local and global minimizers of the free-energy functional. Next, we address the corresponding evolutionary problem, that is, the geometric evolution of the film profile by surface diffusion. By implementing a suitable minimizing movements scheme we establish local-in-time existence and uniqueness of a solution. Finally, for a suitable class of initial data, we prove the existence of a global-in-time solution and study the corresponding long-time behavior.